


IN THE CLAIMS:

Please cancel Claims 1-54.

Please add new Claims 55-78:

1-54. (Currently Cancelled)

55. (New) A method of producing high purity ammonium dimolybdate from low grade molybdenite concentrates comprising:

- 
- a) forming an aqueous slurry of said low grade molybdenite concentrates;
 - b) oxidizing said slurry in an atmosphere containing free oxygen at ^{an} pressure of at least about 50 p.s.i. and at a temperature of at least about 200°C and thereafter producing a first discharge with greater than about 99% of the molybdenum in said low grade molybdenite concentrates oxidized and greater than about 80% of molybdenum values insoluble;
 - c) filtering said first discharge to produce a first liquid filtrate containing soluble molybdenum values and a first solid filter cake containing the insoluble molybdenum values;
 - d) leaching said first solid filter cake with an alkaline solution to produce a second discharge wherein greater than about 98% of the insoluble molybdenum values are solubilized;
 - e) filtering said second discharge to produce a second liquid filtrate and a second solid filter cake;
 - f) recovering the molybdenum values from said second liquid filtrate by solvent extraction with an organic solvent to produce a first liquor by (1) contacting said second liquid filtrate with said organic solvent to form a two-phase mixture; (2) simultaneously reducing the pH level in said two-phase mixture such that the molybdenum values in said second liquid filtrate are extracted into said organic solvent; and (3) stripping said organic solvent to recover the molybdenum values;
 - g) crystallizing said first liquor containing the extracted molybdenum values to produce crystals and a second liquor; and
 - h) recovering said high purity ammonium dimolybdate suitable as a chemical grade product from said crystals.

56. (New) The method of Claim 55, wherein the organic solvent contains a secondary amine.

57. (New) The method of Claim 56, wherein the organic solvent contains dodecyl amine.


58. (New) The method of Claim 55, wherein the reduced pH level in said two-phase mixture ranges from about 4.0 to about 4.5.

59. (New) The method of Claim 55, wherein the reducing^{NAB} step is accomplished by adding hydrated sulfuric acid to said two-phase mixture.

60. (New) The method of Claim 55, wherein the stripping^{NAB} step uses ammonium hydroxide to recover the molybdenum values.

61. (New) The method of Claim 55, wherein the pH level during the stripping^{NAB} step is maintained at about 9.0.

62. (New) A method of producing high purity ammonium dimolybdate from low grade molybdenite concentrates comprising:

- 
- a) forming an aqueous slurry of said low grade molybdenite concentrates;
 - b) oxidizing said slurry in an atmosphere containing free oxygen at a pressure of at least about 50 p.s.i. and at a temperature of at least about 200°C and thereafter producing a first discharge with greater than about 99% of the molybdenum in said low grade molybdenite concentrates oxidized and greater than about 80% of molybdenum values insoluble;
 - c) separating and filtering said first discharge to produce a first liquid filtrate containing soluble molybdenum values and a first solid filter cake containing the insoluble molybdenum values;
 - d) leaching said first solid filter cake with an ammoniacal solution to produce a second discharge wherein greater than about 98% of the insoluble molybdenum values are solubilized;
 - e) filtering said second discharge to produce a second liquid filtrate and a second solid filter cake;
 - f) aging said second liquid filtrate;
 - g) crystallizing said second liquid filtrate to produce crystals and a first liquor; and
 - h) recovering said high purity ammonium dimolybdate suitable as a chemical grade product from said crystals;

wherein the method further comprises subjecting said first liquid filtrate produced in step (c) to a solvent extraction process to recover molybdenum values, said solvent extraction process comprising contacting said first liquid filtrate with an organic solvent to form a two-phase mixture, ^{simultaneously} reducing the pH level in said two-phase mixture such that the molybdenum values in said first liquid filtrate are extracted into said organic solvent, and stripping said organic solvent to produce a second liquor containing the recovered molybdenum values.

63. (New) The method of Claim 62, wherein the organic solvent contains a secondary amine.

64. (New) The method of Claim 63, wherein the organic solvent contains di, tri, decyl amine.

65. (New) The method of Claim 62, wherein the reduced pH level in said two-phase mixture ranges from about 4.0 to about 4.5.

66. (New) The method of Claim 62, wherein the reducing ^{NAB} [step] is accomplished by adding hydrated sulfuric acid to said two-phase mixture.

67. (New) The method of Claim 62, wherein the stripping ^{NAB} [step] uses sulfuric acid to recover the molybdenum values.

68. (New) The method of Claim 62, wherein the pH level during the stripping ^{NAB} [step] is maintained at about less than 3.0.

69. (New) The method of Claim 62, further comprising recycling a portion of said second liquor back to the aqueous slurry in step (a).

70. (New) The method of Claim 62, further comprising subjecting said second liquor to a cementation process to recover copper values, said cementation process comprising adding iron to said second liquor and mixing to produce a first solution, filtering said first solution to produce a third liquid filtrate and a third solid filter cake, and then recovering said copper values from said third solid filter cake.

71. (New) A method of producing high purity ammonium dimolybdate from low grade molybdenite concentrates comprising:

- a) forming an aqueous slurry of said low grade molybdenite concentrates;
- b) oxidizing said slurry in an atmosphere containing free oxygen at an pressure of at least about 50 p.s.i. and at a temperature of at least about 200°C and thereafter producing a first discharge with greater than about 99% of the molybdenum in

said low grade molybdenite concentrates oxidized and greater than about 80% of molybdenum values insoluble;

- c) separating and filtering said first discharge to produce a first liquid filtrate containing soluble molybdenum values and a first solid filter cake containing the insoluble molybdenum values;
- d) leaching said first solid filter cake with an ammoniacal solution to produce a second discharge wherein greater than about 98% of the insoluble molybdenum values are solubilized;
- e) filtering said second discharge to produce a second liquid filtrate and a second solid filter cake;
- f) aging said second liquid filtrate and adding a reagent selected from the group consisting of iron molybdate, ammonium sulfide, sulfide compounds, and ferric sulfate to said second liquid filtrate;
- g) crystallizing said second liquid filtrate to produce crystals and a first liquor; and
- h) recovering said high purity ammonium dimolybdate suitable as a chemical grade product from said crystals.

72. (New) A method of producing high purity ammonium dimolybdate from low grade molybdenite concentrates comprising:

- a) forming an aqueous slurry of said low grade molybdenite concentrates;
- b) oxidizing said slurry in an atmosphere containing free oxygen at a pressure of at least about 50 p.s.i. and at a temperature of at least about 200°C and thereafter producing a first discharge with greater than about 99% of the molybdenum in said low grade molybdenite concentrates oxidized and greater than about 80% of molybdenum values insoluble;
- c) leaching said first discharge with an alkaline solution to produce a second discharge wherein greater than about 98% of the insoluble molybdenum values are solubilized;
- d) separating and filtering said second discharge to produce a liquid filtrate containing soluble molybdenum values and a solid filter cake containing the insoluble molybdenum values;
- e) recovering the molybdenum values from said liquid filtrate by solvent extraction with an organic solvent to produce a first liquor by (1) contacting said liquid

- filtrate with said organic solvent to form a two-phase mixture; (2) simultaneously reducing the pH level in said two-phase mixture such that the molybdenum values in said liquid filtrate are extracted into said organic solvent; and (3) stripping said organic solvent to recover the molybdenum values;
- f) crystallizing said first liquor containing the extracted molybdenum values to produce crystals and a second liquor; and
- g) recovering said high purity ammonium dimolybdate suitable as a chemical grade product from said crystals.

73. (New) The method of Claim 72, wherein the organic solvent contains a secondary amine.

74. (New) The method of Claim 73, wherein the organic solvent contains di, tridecyl amine.

75. (New) The method of Claim 72, wherein the reduced pH level in said two-phase mixture ranges from about 4.0 to about 4.5.

76. (New) The method of Claim 72, wherein the reducing ^{NAB} [step] is accomplished by adding hydrated sulfuric acid to said two-phase mixture.

77. (New) The method of Claim 72, wherein the stripping ^{NAB} [step] uses ammonium hydroxide to recover the molybdenum values.

78. (New) The method of Claim 72, wherein the pH level during the stripping [step] is maintained at about 9.0.